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# TAXONOMIC POSITION OF THE GENUS NEOHETEROBOTHRIUM PRICE, 1943...

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# TAXONOMIC POSITION OF THE GENUS *NEOHETEROBOTHRIUM* PRICE, 1943 (MONOGENEA, DICLIDOPHORIDAEA) IN CONNECTION WITH THE DESCRIPTION OF THE NEW SPECIES *N. SYACII* SP. N.

**by Yu. L. Mamaev**

The paper describes a new species, *Neoheterobothrium syacii* sp. n., found on the righteye flounders in the Gulf of Mexico; gives a new, more precise diagnosis of the genus *Neoheterobothrium* Price, 1943 (as a member of the subfamily Choricotylinae); validates the erection of the new genus *Neodiclidophora* gen n. (as a member of the subfamily Diclidophorinae) for the species *Diclidophora pugetensis* Robinson, 1961 (syn. *Neoheterobothrium pugetensis*), and discusses the circumstances that have led to the confusion regarding the taxonomic position of the genus *Neoheterobothrium*.

The genus *Neoheterobothrium* was erected by Price in 1943 (Price, 1943). He chose *N. affine* (Linton, 1898) (syn. *Octoplectanum a.* Linton, 1898; *Diclidophora a.* (L.) Linton, 1901; *Heterobothrium a.* (L.) Price, 1936; *Choricotyle a.* (L.) Llewellyn, 1941; *Dactylocotyle a.* (L.) Brinkmann, 1942) from the righteye flounders of the Atlantic Ocean as the type species of the genus. Price assigned two more species to this genus: *Neoheterobothrium cynoscioni* (MacCallum, 1917) (syn. *Diclidophora c.* MacCallum, 1917; *Choricotyle c.* (MacC.), Llewellyn, 1941) from *Cynoscion regalis* (Sciaenidae), and *Neoheterobothrium leptogaster* (Leuckart, 1830) (syn. *Octobothrium l.* Leuckart, 1830; *Chimaericola l.* (L.) Brinkmann, 1942) from the chimaeras.

Sproston (Sproston, 1946) refused to recognize the genus *Neoheterobothrium*. She assigned the type species to the genus *Heterobothrium* Cerfontaine, 1895, the second species to the genus *Choricotyle* van Beneden et Hesse, 1863, and the third species to the genus *Chimaericola* Brinkmann, 1942, with the comment that placing this species in the genus *Neoheterobothrium* was a deplorable mistake on the part of Price (which is certainly true, although it should be noted that at the time Price was apparently unaware of Brinkmann's paper, published a short time before, in which the species was given the status of a separate genus).

Bykhovskii's [Bychowsky] views on the subject, as expressed in his monograph (1957), generally coincide with those of Sproston.

Yamaguti (1963) reinstated the genus *Neoheterobothrium*, assigning to it, in addition to *N. affine* and *N. cynoscioni*, also the species *N. pugetensis* (Robinson, 1961) (syn. *Diclidophora p.* Robinson, 1961).

In my paper on the taxonomy and phylogeny of the family Diclidophoridae I wrote: "After studying the specimens of *N. pugetensis* kept at our Laboratory, we have reached the conclusion that *Neoheterobothrium* is a separate genus of the subfamily Diclidophorinae (and not Choricotylinae, as Price and Yamaguti believed). It is fairly similar to the genera *Lebboia* and *Diclidophora*, but quite dissimilar phylogenetically from the genus *Heterobothrium*. For the past several years, Bykhovskii has also been inclined to support this view. This genus has only two members: *N. affine* and *N. pugetensis*. The third species, *N. cynoscioni*, assigned to it by Yamaguti, is in fact a member of the genus *Choricotyle* (pp. 59-60, Mamaev, 1976). I held this view on the composition and taxonomic position of the genus *Neoheterobothrium* until, quite recently, E.V. Zhukov (Zoological Institute of the Academy of Sciences of the USSR, Leningrad) sent me a few specimens of monogenetic flukes recovered from flounders in the Gulf of Mexico, which he had tentatively identified as *Neoheterobothrium affine*. Upon thorough examination, I came to the conclusion that those specimens belonged to a new species which was quite distinct from, though very similar to, *N. affine*. But the examination had another, even more important outcome: quite unexpectedly, it gave me a very clear idea of the taxonomic position and composition of the genus *Neoheterobothrium*. I was able to establish that this genus belonged to the subfamily Choricotylinae, and not Diclidophorinae, and that it included three species: the type species *N. affine*, the new species, and *N. exilis* (Crane, 1972), comb. n. I also realized that *N. pugetensis* constituted a new separate genus (in the subfamily Diclidophorinae). My discovery revealed a very illuminating series of incorrect identifications and mistakes made by various authors (including myself), which are worth discussing in greater detail.

*N. affine* (originally *Octoplectanum affine*) was first described, very briefly, by Linton (Linton, 1898), who had only a few shrunken specimens of the fluke at his disposal. It is not surprising, therefore, that different authors assigned this species to a wide range of different genera (cf. the synonymy). Later, Price (Price, 1943) used Linton's type material to produce a new description of the species. But the confusion persisted, because Price's paper contained no information, beyond a very sketchy drawing, about the structure of the fluke's adhesive clamp. However, as has now become apparent, Price was perfectly right in erecting the new genus *Neoheterobothrium*. By refusing to recognize this genus and by placing the type species *N. affine* back in the genus *Heterobothrium*, Sproston (1946) paved the way for further mistakes.

After discovering monogenetic flukes of the family Diclidophoridae on Pacific arrowtooth flounders, Bykhovskii and Nagibina incorrectly identified them as *Heterobothrium affinis*. Nagibina (1953) described their morphology, and Bykhovskii (1957) amplified her description and studied

the adhesive apparatus by means of which they attach themselves to their host's gills (cf. pp. 434-436). Knowing that Sproston (1946) had so confidently (though erroneously!) assigned the genus *Heterobothrium* to the subfamily Choricotylinae and that the adhesive clamps of the newly discovered monogenetic flukes and their manner of attaching themselves to their host's gills were very similar to those of the monogeneans of the genus *Diclidophora*, Bykhvskii felt doubtful about the advisability of distinguishing this subfamily. The incorrect identification was largely responsible for his decision not to recognize the division of the family Diclidophoridae into the subfamilies Diclidophorinae and Choricotylinae.

Later, Robinson (Robinson, 1961), using his own material, recovered also from Pacific arrowtooth flounders, described these monogenetic flukes as the new species *Diclidophora pugetensis*. He made no references to Nagibina's and Bykhovskii's papers, probably because he had not realized that they contained a description of the same species.

It should be noted that in outward appearance the species *N. affine* and *D. pugetensis* are very similar, but they differ sharply in the structure of their adhesive clamps. Considering the fact that Price's drawing of the clamp in *N. affine* was so sketchy and also the fact that Sproston placed this species in the genus *Heterobothrium*, whose type species, thoroughly described by Goto (Goto, 1894), is, as is known, characterized by clamps of the "diclidophoridian" closed type, it is easy to see what caused Bykhovskii and Nagibina to make a mistake in identifying their material. What is more difficult to understand is why Yamaguti, who had at his disposal the type material used by Linton and Price, and Robinson, should still have placed *D. pugetensis* in the genus *Neoheterobothrium* (although he was well aware of the existence of "distinct differences" between the species *pugetensis* and *affine*; cf. Yamaguti, 1963, p. 185).

As indicated above (cf. the passage from my paper published in 1976), I decided to transfer the genus *Neoheterobothrium* from the subfamily Choricotylinae to the subfamily Diclidophorinae on the basis of the special structural features I had detected in the adhesive clamp of the species *N. pugetensis*. This was another mistake. It is true that other researchers also expressed doubts as to the advisability of including this species in the genus *Neoheterobothrium* (the clamp of *N. affine* in Price's drawing looked too much like the open clamps of the Choricotylinae species), but the weight of Yamaguti's reputation as an excellent morphologist helped to overcome them. In all my other papers, including the general review of the systematics of the higher monogeneans (Mamaev, Lebedev, 1977; Mamaev, Lebedev, 1979), the genus *Neoheterobothrium* is also assigned to the subfamily Diclidophorinae.

Further study of preparations of the new species will make it posssible to correct the mistakes that have been made. Given below is a description of

the new species, a new diagnosis of the genus *Neoheterobothrium* and a diagnosis of the new genus *Neodiclidophora* Mamaev gen. n.

***Neoheterobothrium syacii*** Mamaev et Zhukov, sp. n. (Figure, *a - c*)

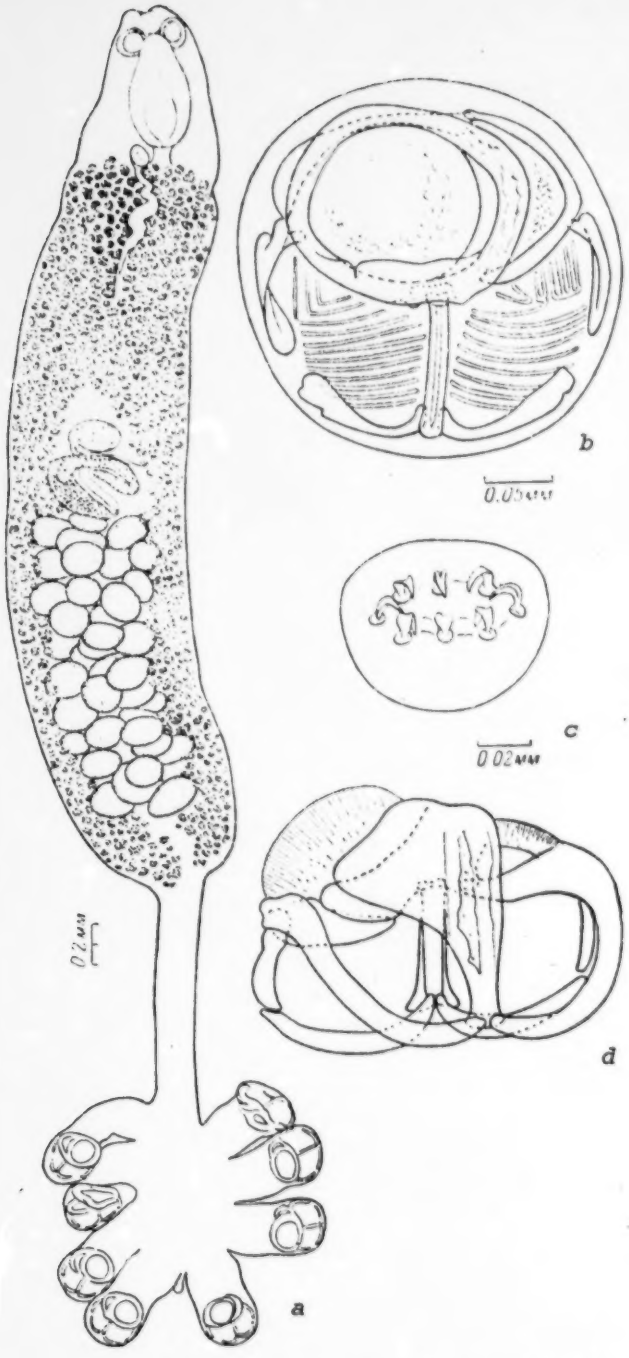
Host: *Syacium* sp. (fam. Bothidae).

Distribution: Gulf of Mexico (Gulf of Campeche). Collected by E.V. Zhukov. Holotype No. 277/83, paratype No. 83-1. (the holotype is preserved in the collections of the Zoological Institute, the paratype is kept at the Laboratory of General Helminthology of the Byelorussian Polytechnical Institute).

Morphology (based on two specimens - the holotype and the paratype). Medium-sized monogeneans with a spindle-shaped body and a small adhesive disk on a thin stem. Attached to the disk by means of fairly long finger-like pedicles are eight adhesive clamps. Overall length: 5.94-6.25 mm. Length of the body proper: 4.24-4.37 mm. Maximum width of the body: 0.68-0.80 mm. Length of the stem: 0.70-0.82 mm. Length and width of the adhesive disk (with the clamps): 1.00-1.06 and 1.16-1.40 mm. The adhesive clamps are 0.21-0.27 mm in diameter. They are of the open type, saucer-shaped, similar in structure to those found in representatives of the subfamily Choricotylinae (see figure, *b*). In this species, however, the skeleton of the clamp is different in that its main central plate has the form of a monolithic ring, to which (on the ventral side) is solidly attached one of the anterior side plates (still perfectly discernible). The other six plates are not attached and have no unusual structural features. The interior surface of the posterior part of the clamp is covered with well-developed thin chitinous stripes. The anterior part of the clamp bears indistinct, irregularly shaped patches. Between the two posterior clamp pedicles there is a tear-shaped posterior process 0.09-0.11 mm long with two pairs of hooks 0.022 and 0.016 mm long.

The anterior suckers are 0.12-0.15 x 0.09-0.11 mm in size. Compared to them, the pharynx is very large: 0.50-0.51 x 0.25-0.28 mm. The esophagus is short. The main intestinal branches in the body proper have small lateral caeca. The main branches do not merge in the body but pass, in the form of two thin smooth ducts, through the stem into the adhesive disk, where they finally merge and develop long ramifications extending into the pedicles of the clamps.

The testes, 28-42 in number, are located in the posterior part of the body behind the ovary. The copulatory organ is 0.06-0.07 mm in diameter and has eight hooks (see figure, *c*). The ovary is small, e-shaped, its mature end is posteriorly directed. The small, oval seminal receptacle is located before the ovary. No eggs have been found.




*Neoheterobothrium syacii* sp. n.

*a* - general view of the fluke; *b* - its adhesive clamp; *c* - copulatory organ; *d* - adhesive clamp of *Neodiclidophora pugetensis* (Robinson,1961) comb. n. (original)

Diagnosis of the genus ***Neoheterobothrium*** Price, 1943

Diclidophoridae, Choricotylinae with a spindle-shaped body and a short adhesive disk attached to a long, thin stem, with four pairs of clamps on finger-like pedicles. The clamps are of the open type, saucer-shaped, asymmetrical, consisting of seven plates. The main central plate has the form of a monolithic ring. One of the anterior side plates is attached to it, but is still pefectly discernible. The interior surface of the posterior part of the clamp is covered with thin stripes, while the interior surface of the anterior part is covered with irregularly shaped patches. The adhesive disk has a small posterior process with two pairs of hooks. The main intestinal branches have lateral caeca in the body proper, but are thin and smooth in the stem. They merge and ramify in the adhesive disk. The numerous testes are located behind the ovary. The copulatory organ is of the usual type: a muscular bulb with a crown of falciform hooks. The ovary is short, e-shaped, its mature end directed posteriorly. The seminal receptacle is located before the ovary. The yolk glands are all located inside the body proper. There is no vagina. Representatives of the genus are parasites of flatfishes.

Type species: *N. affine* (Linton, 1898) Price, 1943 from *Papalichthys dentatus* (Atlantic Ocean, in the Woods Hole area), *P. lethostomus* (Gulf of Mexico, off the Louisiana coast).

Other species: *N. syacii* Mamaev et Zhukov, sp. n. from *Syacium* sp. (Gulf of Mexico, Gulf of Campeche). *N. exilis* (Crane, 1972), comb. n. (syn. *Choricotyle exilis* Crane, 1972; *Orbocotyle e.* (C., 1972) Mamaev et Aleshkina, 1984) from *Lyopsetta exilis* (Pacific Ocean, off the coast of California).

In the structure of their adhesive clamps the genus *Neoheterobothrium* is particularly similar to the genus *Orbocotyle* Euzet et Suriano, 1975, differing from it in having a long adhesive disk stem and a seminal receptacle that is located before, and not behind, the ovary.

Diagnosis of the genus ***Neodiclidophora*** Mamaev, gen. n.

Diclidophoridae, Diclidophorinae with a spindle-shaped body and a short but wide adhesive disk attached to a long, thin stem, with four pairs of clamps on finger-like pedicles. The clamps are of the closed type, asymmetrical, consisting of eight plates. The main central plate has a small triangular membrane in its central part. The base of one of the anterior side plates is attached to the base of the central plate, forming a half-ring around the sucker. The interior surface of the posterior part of the clamp is covered with thin chitinous stripes (see figure, *d*). The adhesive disk has a small posterior process with two pairs of hooks. The main intestinal branches have

lateral caeca in the body proper, but are thin and smooth in the stem. They merge and ramify in the adhesive disk. The numerous testes are located behind the ovary. The copulatory organ is of the usual type: a muscular bulb with a crown of falciform hooks. The ovary is short, N-shaped, its mature end directed anteriorly. The seminal receptacle is located before the ovary. The yolk glands are all located inside the body proper. There is no vagina. Representatives of the genus are parasites of flatfishes (halibut).

Type (and only) species: *N. pugetensis* (Robinson, 1961) Mamaev, comb. n. from *Atheresthes stomias*, *A. evermanni*, *Reinhardtius hippoglossoides matsuurae*, *Hippoglossus hippoglossus stenolepis* (Northern part of the Pacific Ocean near the coasts of America and Asia).

The genus *Neodiclidophora* differs from the the genus *Diclidophora* in having clamps with a small (not fully developed) triangular membrane and an adhesive disk attached to a thin, long stem.

**References**

Bykhovskii [Bychowsky] B.E. Monogenetic trematodes, their systematics and phylogeny. Moscow-Leningrad, Publishing House of the Academy of Sciences of the USSR, 1957, 509 p.

Mamaev Yu.L. Systematics and phylogeny of monogenetic trematodes of the family Diclidophoridae. - In: Fauna, systematics and phylogeny of the monogenetic trematodes. Vladivostok, 1976, p. 57-80.

Mamaev Yu.L., Lebedev. B.I. Systematics of the higher monogenetic trematodes in the light of new data. - In: Studies of monogenetic trematodes in the USSR (Proceedings of the All-Union Symposium on Monogenetic Trematodes), Leningrad, 1977, p. 21-26.

Nagibina L.F. *Heterobothrium affinis* (Linton) and its position in the systematics of the monogenetic trematodes of the family Diclidophoridae Fuhrmann. - Transactions of the Zoological Institute of the Academy of Sciences of the USSR, 1953, vol. 13, p. 137-144.

Linton E. Notes on trematode parasites of fishes. - Proc. U.S. Nat. Mus., 1898, vol. 20, p. 507-548.

Mamaev Yu.L., Lebedev B.I. The system of higher monogeneans in the light of recent knowledge. - Zool. Scripta, 1979, vol. 8, p. 13-18.

Price E. North American monogenetic trematodes. VI. The family Diclidophoridae (Diclidophoroidae). - J. Wash. Acad. Sc., 1943, vol. 33, N 2, p. 44-54.

Robinson E.S. Some monogenetic trematodes from marine fishes of the Pacific. - Trans. Micr. Soc., 1961, vol. 80, N 3, p. 235-266.

Sproston N.G. A synopsis of the monogenetic trematodes. - Trans. Zool. Soc. London, 1946, vol. 35, N 4, p. 185-600.
Yamaguti S. Systema helminthum. IV. Monogenea and Aspidocotylea. N.Y.-London, Intersc. Publ., 1963, 699 p.

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